

Claims

1. A sensor comprising
a substrate;
- 5 a confinement structure disposed on the substrate, wherein the confinement structure comprises at least a first limiting structure defining a first interior space;
a transducer proximal to the first interior space; and
a first synthetic polymer capable of selectively binding a first analyte, within the confinement structure.
- 10 2. A sensor as claimed in claim 1, wherein the confinement structure further comprises a second limiting structure defining a second interior space, the second interior space containing the first interior space.
3. A sensor as claimed in claim 2, wherein the confinement structure further comprises one or more further limiting structures defining one or more further interior
15 spaces, the one or more further interior spaces each containing a preceding interior space.
4. A sensor as claimed in any preceding claim, wherein the first synthetic polymer capable of selectively binding a first analyte is disposed in the first interior space.
5. A sensor as claimed in any preceding claim, wherein the first synthetic polymer
20 capable of selectively binding a first analyte is disposed in the second or one or more further interior spaces.
6. A sensor as claimed in any preceding claim, wherein the internal diameter of the first limiting structure is about 10-350 μm .
7. A sensor as claimed in any preceding claim, wherein height of the first limiting
25 structure is about 1-10 μm .
8. A sensor as claimed in any of claims 2 to 7, wherein the internal diameter of the second limiting structure is about 50-600 μm .

9. A sensor as claimed in any of claims 2 to 8, wherein the height of the second limiting structure is about 1-100 μm .
10. A sensor as claimed in any preceding claim, wherein the limiting structures of the confinement structure are annular.
- 5 11. A sensor as claimed in any preceding claim, wherein the sensor further comprises at least one additional confinement structure as defined in any preceding claim; a transducer proximal to the first interior space of each of the at least one additional confinement structures; and a material contained within the at least one additional confinement structure, wherein
- 10 the material is the synthetic polymer capable of selectively binding a first analyte, a further synthetic polymer capable of selectively binding a further analyte, or a reference material.
12. A sensor as claimed in any preceding claim, wherein the first synthetic polymer is a molecularly imprinted polymer.
- 15 13. A sensor as claimed in any preceding claim, wherein the first synthetic polymer is a polymer capable of selectively binding morphine, propofol, an antibiotic or IMA.
14. A sensor as claimed in claim 11, wherein the further synthetic polymer is a molecularly imprinted polymer.
15. A sensor as claimed in claim 11, wherein the sensor comprises at least one
- 20 additional confinement structure having a reference material therein, and the first synthetic polymer is a molecularly imprinted polymer and the reference material is a corresponding non-imprinted polymer.
16. A sensor as claimed in any preceding claim, wherein the first, second or further interior spaces contain a conducting material and/or a mediator.
- 25 17. A sensor as claimed in claim 16, wherein the conducting material is an electrolyte.

18. A sensor as claimed in any preceding claim, wherein the at least one confinement structure further comprises one or more additional substance which provides a specific environment therein.

5 19. A sensor as claimed in claim 14, wherein the specific environment is a non-aqueous environment.

20. A sensor as claimed in any preceding claim, wherein the transducer is disposed on the substrate.

10 21. A sensor as claimed in any preceding claim, wherein the transducer is an electrochemical, conductimetric, optical, fluorescent, luminescent, absorption, time-of-flight, gravimetric, strain or displacement, surface-acoustic wave, resonant or thermal transducer, or combinations thereof.

22. A sensor as claimed in any preceding claim, wherein the substrate is a silicon wafer.

15 23. A sensor as claimed in any preceding claim, wherein the substrate is substantially planar.

24. A sensor as claimed in any preceding claim, wherein the confinement structure is fabricated from a polyimide.

20 25. A method of detecting a target species in a sample comprising contacting a sensor as claimed in any preceding claim with a sample containing or suspected to contain the target species.

26. A method as claimed in claim 25, wherein the sample is returned to the patient.

27. A method as claimed in claim 25, wherein the sample is not returned to the patient.